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August 1, 1957

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8/19  
9:00*

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Subject: Contract 112, Task II

Dear Sir:

This reports progress during June, 1957, on the development of an Equipment Safeguard Unit, which shall meet the following requirements:

1. The unit shall be wholly contained in a weather-tight enclosure of dimensions approximately 6" x 5-3/4" x 4" (dimensions to meet AN rack mounted equipment specifications).
2. The unit shall initiate two strands of Primacord through reliable independent explosive trains.
3. The unit shall be so designed as to prevent accidental initiation by requiring two-handed operation.
4. The unit shall provide a reliable time delay of at least 30 seconds between actuation and initiation.
5. The unit shall pass environmental tests necessary for qualification under Military Specification MIL-E-5272A, titled "Environmental Testing, Aeronautical and Associated Equipment, General Specifications for,"

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~~SECRET~~**CONFIDENTIAL**

- 2 -

**SECRET**

6. The unit shall be so designed as to permit surveillance and replacement of explosive and pyrotechnic components periodically.

7. The unit shall be detonator safe; that is, initiation of the detonators in the safe position shall not initiate the succeeding elements in the explosive train, nor shall such initiation throw fragments or particles from the weather-tight enclosure.

### PROGRESS

During the period covered by this report, a model was fabricated of an Equipment Safeguard Unit having two delay columns. This unit was fabricated from design sketches, no layout drawing being made. The unit (shown assembled and dis-assembled in pictures contained in the appendix) consists of a rotor containing the delay columns, a body which houses the firing pins and the booster charge, a cover plate, a face plate to provide and meet AN rack mounting requirements, a safety button to insure that the rotor cannot be accidentally turned to the armed position, and a lever or handle to provide a means for arming the rotor. To further provide safety, it was intended to secure the safety button with a cotter pin and pull ring.

To operate the unit, it is necessary to remove the cotter pin, depress and hold the safety button, and rotate the lever 90° in a clockwise direction (as far as it will turn), at which time the rotor has reached the armed position and the firing pins are released to initiate the delay columns.

The sample, as fabricated, brought to light the problem of eliminating friction on the rotor if a spring is to be used to return the rotor to the unarmed position at any time it is not fully armed. Subsequent tests, in which teflon bearings on the rotor and on the faces of the firing pins have been used, indicate that this problem is not unsurmountable.

Nothing has been done at this time on finalizing the design of the explosive components. It is believed to

- 3 -

**SECRET**

be advantageous to finalize the mechanical design and then have the loading engineer design his explosive components to work with the mechanical design.

This sample unit was shown to [ ] and discussed with him. As a result of this discussion, the following features were agreed upon:

25X1

a. The unit would have four delay columns and two boosters in order that reliability might be kept as high as possible.

b. The safety button and lever would be locked together and secured with a wire and lead seal, in lieu of the present cotter pin and pull ring feature.

c. All aluminum parts will be anodized.

d. Materials will be used which will eliminate any possibility of corrosive action during long term storage.

e. Size and weight will be kept to a minimum consistent with AN specifications, to permit the unit to be ceiling or overhead mounted.

f. Operating instructions as follows will be shown on the face plate:

- (1) Break seal
- (2) Lift lever
- (3) Push button
- (4) Rotate lever

g. Face plate will be colored red.

h. The words "Equipment Safeguard" will appear on face plate.

i. Qualification tests will be performed at [ ] if necessary.

25X1

j. A demonstrable model of the unit will be fabricated for [ ]

25X1

**SECRET**

- 4 -

**SECRET**

k. The contract will be amended to provide for the design, fabrication and testing of Primacord end caps, tee-connectors, union connectors and joining connectors for the Equipment Safeguard Unit.

l. Connectors in addition to being submitted to usual environmental and rough handling tests will be assembled and dis-assembled roughly for 50 cycles and then tested for functioning.

m. Only approved lubricants will be used if needed (molybdenum disulfide suggested).

n. Equipment Safeguard Units and connectors will be subjected to qualification tests using live Primacord, and will be expected to function the Primacord after such tests.

#### FUTURE WORK

A design (shown on Drawing R-12502 in appendix), incorporating the above features, is in process, and fabrication of the first sample has started. The program of work is expected to follow the outline shown on Chart Number 1, as contained in the appendix.

#### STATUS OF FUNDS

Funds Allocated	\$ 13,900
Previous Expenditures	
Balance at Beginning of Period	13,900
Expenditure During Period	3,718
Balance at End of Period	10,182

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PROGRAM CHART NUMBER 1

	<u>E</u>	<u>D</u>	<u>S</u>	<u>Jun.</u>	<u>Jul.</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>
Component Test	80	150	100						
Design Drawing	20	40							
Detail Drawings	20	80							
Test Model	20	80	100						
Fabrication 40 Units	40		300						
Qualification Tests	60								
Final Report and Instructions	260	60							
	500	350	500						

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